

REMARKS

Claims 1-6 were pending at the time of examination. Claims 1-6 have been amended. No new matter has been added. The applicant respectfully requests reconsideration based on the foregoing amendments and these remarks.

Objections to the Drawings

The drawings were objected to because they allegedly did not show all the feature of the claims. In particular, the Examiner stated that the drawings did not show the limitation of bypassing I/O operations. As is clear from the specification, the I/O operations are bypassed by directly accessing the disk with the identified I/O commands. In order to further clarify this in the drawings, block 416 of FIG. 4A and block 430 of FIG. 4B, respectively, have been amended to recite "Bypass I/O operations by directly accessing the disk with the identified I/O commands."

The drawings were also objected to because FIGs. 4A and 4B failed to clearly show which conditions in step 404 lead to the steps 406 and 422. The applicants have corrected this by separating FIGs. 4A and 4B into separate figures, where FIG. 4A is a flow diagram (402) that illustrates operations of the present invention, and FIG. 4B is a flow diagram (418) that illustrates combining asynchronous I/O requests. Block 420 in FIG. 4B corresponds to block 404 in FIG. 4A. The specification has been amended to reflect this correction and to be updated with proper reference numerals.

A replacement sheet 4/5 showing the above corrections to the drawings is attached to this response. No new matter has been added. The applicants respectfully submit that the objections to the drawings be withdrawn.

Information disclosure statement

The Examiner noted that the applicants had failed to provide a legible copy of document EPO 756228 in the information disclosure statement filed on August 25, 2004. In order to correct this deficiency, the applicants provide a copy of the document EPO 756228 along with this response, and submit that the information disclosure statement filed on August 25, 2004 thereby is in compliance with 37 CFR 1.98(a)(2).

Objections to the Specification

The specification was objected to because the title of the invention is not descriptive. In order to overcome the objection, the applicants have amended the title to read “BYPASSING DISK I/O OPERATIONS TO IMPROVE THE PERFORMANCE OF PORTED APPLICATIONS,” which more accurately reflects the subject matter of the claims.

The specification was also objected to because of the way in which the trademarks IBM, AIX, S/390, OS/390 and UNIX were used. The applicants have amended the specification to capitalize all occurrences of the trademarks and inserted generic terminology in the appropriate places. In addition, the Examiner is reminded that further, explicit trademark information is provided on page 25 of the specification.

Finally, the status of the co-pending application listed on page 1 has been updated to recite that the co-pending application is now issued U.S. Patent No. 6,754,734.

The applicants submit that the objections to the specification are moot and should be withdrawn in view of the above amendments.

Double Patenting

Claims 1-6 were rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1, 16 and 31 of U.S. Patent No. 7,113,937 B2. The applicants have submitted a terminal disclaimer in compliance with 37 CFR 1.321(c) along with this response, and respectfully request that the rejection be withdrawn.

Claim Rejections – 35 U.S.C. § 112

Claims 1-6 were rejected under 35 U.S.C § 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. In particular the claims were rejected for insufficient antecedent basis and an overuse of the terminology “said” in the claims. The applicants have reviewed the claims and made the necessary corrections, in particular by substituting “said” with “the” wherever appropriate, in order to improve the readability of the claims. In view of these amendments, the applicants respectfully request that the rejection under 35 U.S.C § 112 be withdrawn.

Claim Rejections – 35 U.S.C. § 102

Claims 1, 3 and 5 were rejected under 35 U.S.C § 102(e) as being anticipated by U.S. Patent No. 6,065,088 to Bronson (hereinafter “Bronson”). The applicants respectfully traverse these rejections.

Claim 1, as amended, recites a computer-implemented method for bypassing disk I/O operations in a computer, and specifically recites the steps of:

“using asynchronous direct disk I/O access commands in the application ordered computer code;
identifying the asynchronous direct disk I/O access commands in the application ordered computer code; and
bypassing the support of the queued disk I/O access commands of the computer by executing the asynchronous direct disk I/O access commands.”

That is, when a computer program application contains asynchronous direct disk I/O access commands, and the computer program application is running on a computer which is optimized for support of queued disk I/O access commands, the asynchronous direct disk I/O access commands are first identified. Then, the regular support on the computer for queued disk I/O access commands is bypassed by executing the asynchronous direct disk I/O access commands.

Typically, the kind of computer program applications that contain asynchronous direct disk I/O access commands are high-performance computer applications, such as databases. Using the method as described in claim 1 improves the performance of computer-implemented disk I/O operations for complex applications, by augmenting general-purpose I/O access features with specialized disk I/O access operations that are tailored to enhance disk I/O access performance for complex applications.

In contrast, Bronson is directed to “an input/output bus bridge and a command queuing system that strictly orders EOI commands relative to MMIO accesses, while simultaneously allowing INR and IRR commands to bypass enqueued MMIO accesses” (col. 1, lines 6-9). As stated in Bronson, the function of the memory mapped I/O (MMIO) command is to send command information to, and retrieve status information from, Bus Unit Controllers and I/O devices (col. 1, lines 19-22). The function of the Interrupt Return (INR) command is to inform the interrupting unit that its interrupt could not be processed due to a queue full condition (col. 1, lines 33-35). The function of the Interrupt Reissue Requests (IRR) command is to inform the interrupting unit(s) that the queue conditions in the interrupt routing unit (within the bridge chip) have changed and that it (the interrupting unit) should resend any previously returned (via INR command) interrupts (col. 1, lines 46-51). Finally, the function of the End of Interrupt (EOI) command is to inform the interrupting unit that a previously sent interrupt has been received and acted upon by the processor (col. 1, lines 59-61).

All of these commands are conventional commands that are designed to run in a PowerPC computer system which is Common Hardware Reference Platform (CHRP) compliant

(col. 1, lines 12-13). In particular, the preferred embodiment disclosed in Bronson is implemented within an I/O bus bridge and memory controller chip (controller chip) which processes interrupt commands and controls the discrete interrupt lines to individual processors (col. 3, lines 12-16). That is, none of the commands are asynchronous direct disk I/O access commands. Also, none of these commands are included in a computer program application with ordered computer code, as required by claim 1.

Furthermore, even if one were to accept the Examiner's reasoning that the INR and IRR commands are interrupt commands, which are not time-dependent, and therefore "asynchronous," they are still not directed to disk I/O operations, as required by claim 1. In particular, the IRR command is described as a command that "is not targeted to a particular device, but is broadcast to all devices capable of generating an interrupt command" (col. 1, lines 55-58). For at least these reasons, it is clear that the rejection of claim 1 is unsupported by the art and should be withdrawn.

Claims 3 and 5 have been amended similarly to claim 1. Claim 5 has also been amended to recite a computer program product instead of an article of manufacture. For reasons substantially similar to those set forth above, the applicant respectfully contends that the rejection of claims 3 and 5 is unsupported by the cited art and should be withdrawn.

Claims 2, 4 and 6 depend from claims 1, 3 and 5, respectively, and are therefore allowable for at least the reasons discussed above.

Conclusion

The applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
MOLLBORN PATENTS


Fredrik Mollborn
Reg. No. 48,587

2840 Colby Drive
Boulder, CO 80305
(303) 459-4527